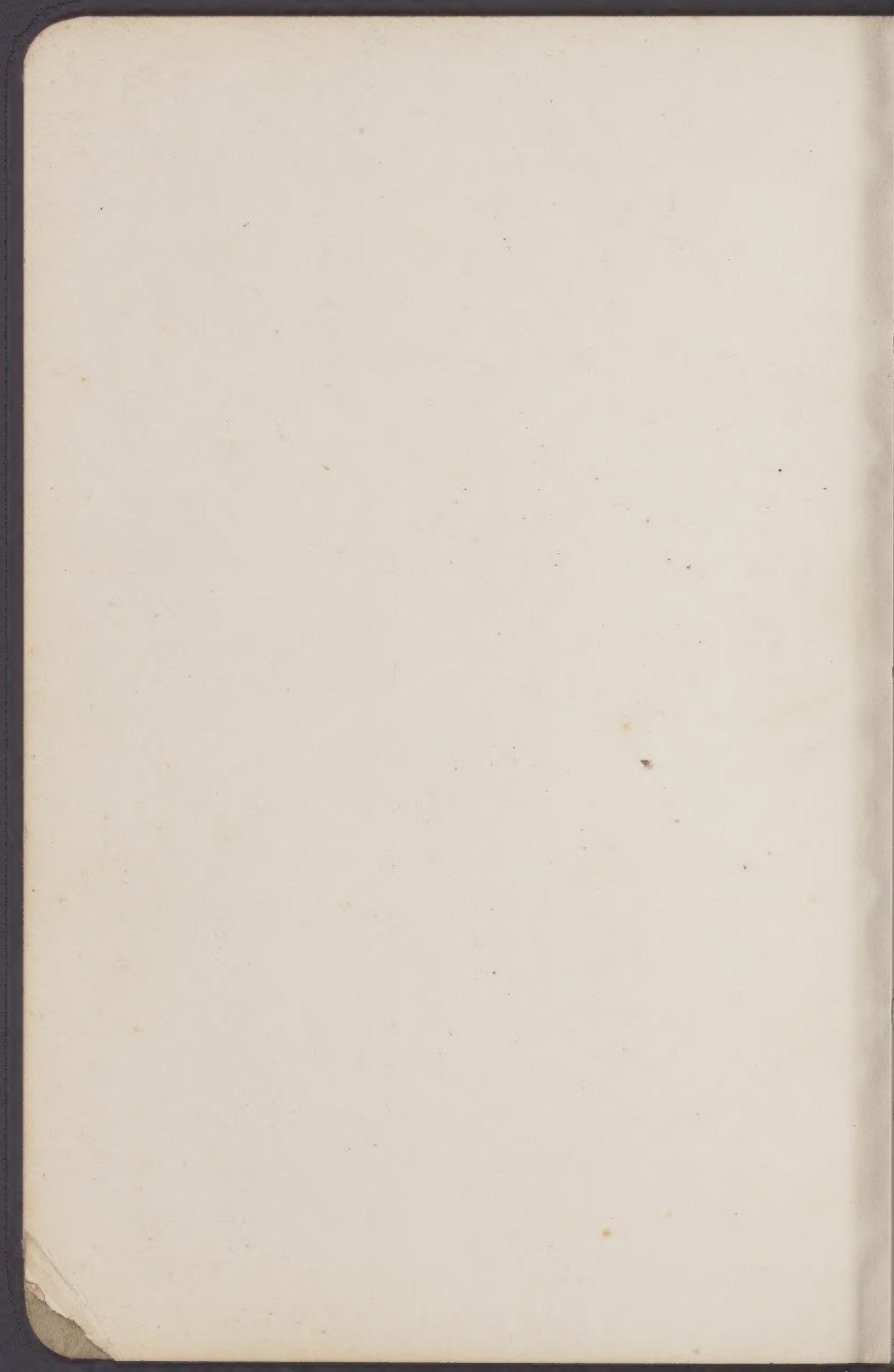


U. S.
TREASURY DEPARTMENT.
STOCK, No. 1716.

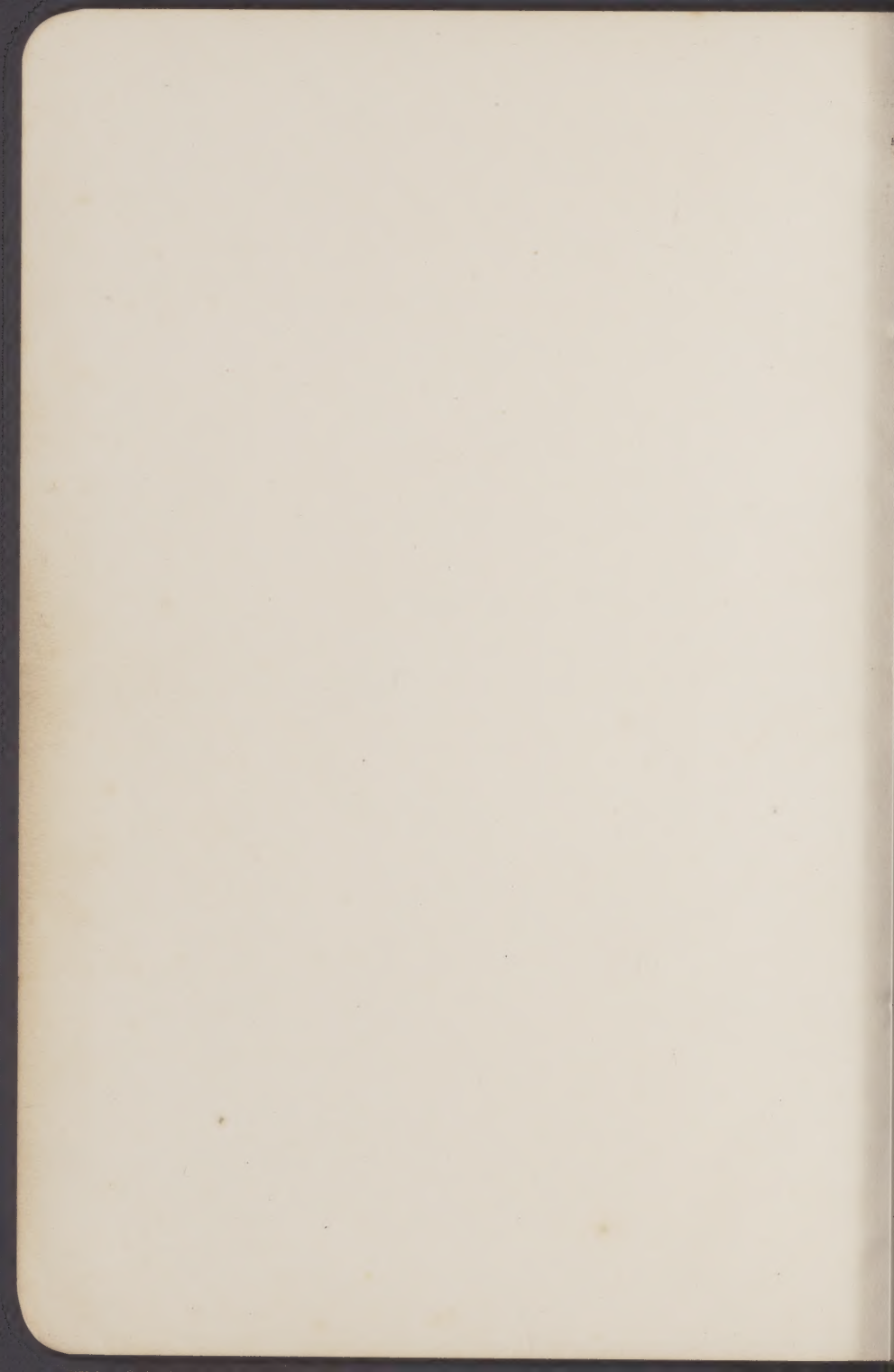


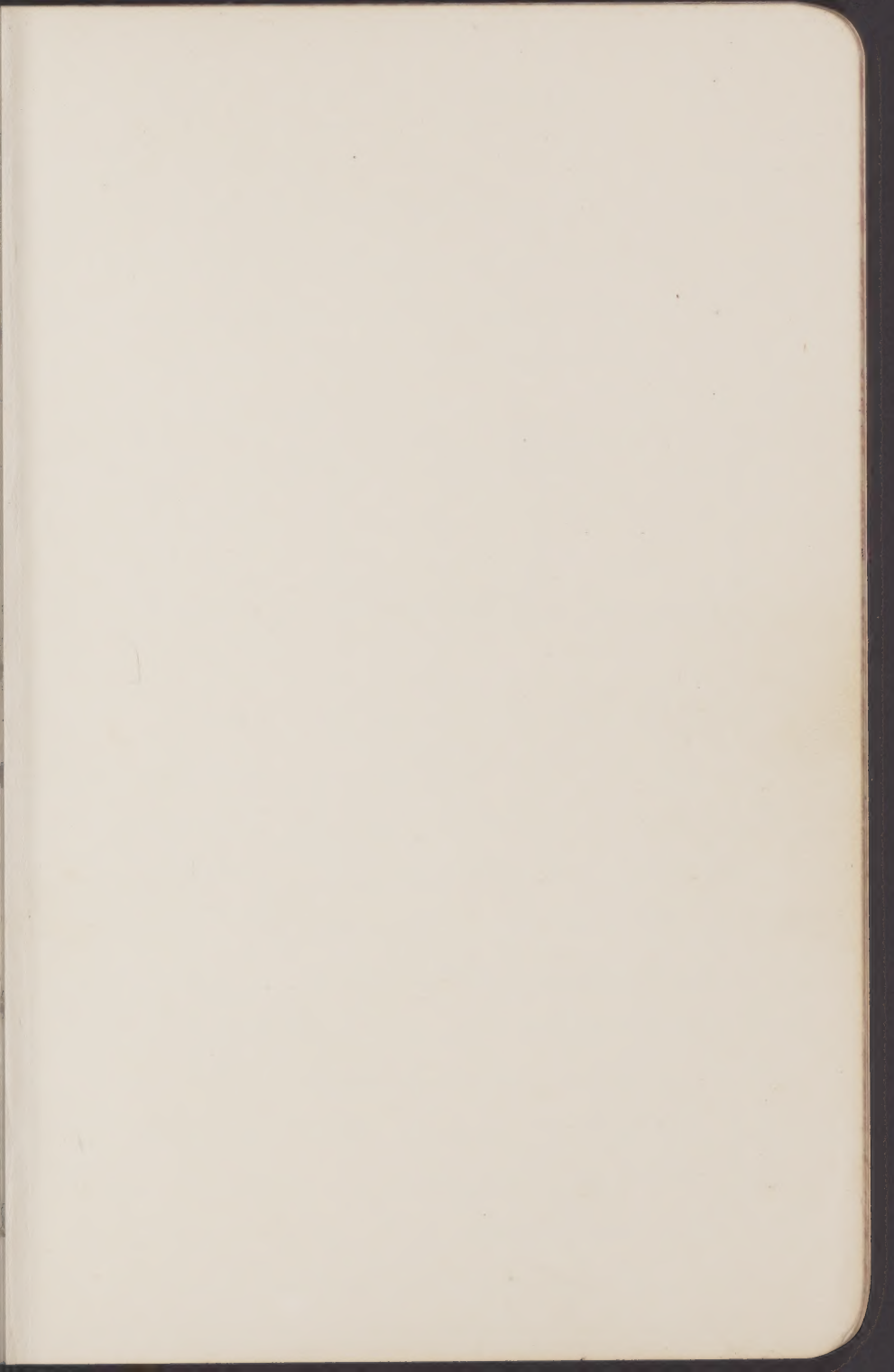
PROPERTY OF

E. R. LEACH

U. S. MINT

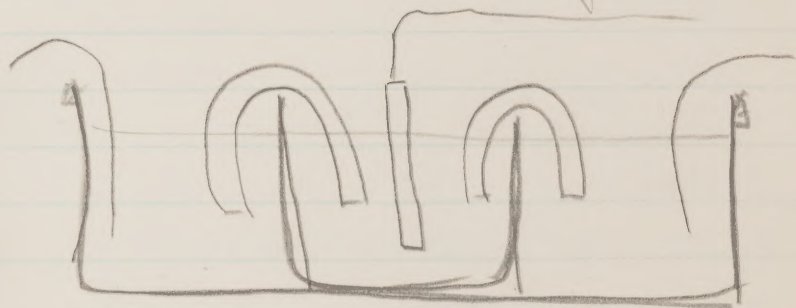
SAN FRANCISCO





PHILADELPHIA

For gold electrolyte worked up as follows. Large tanks same as used in Hor. silver process



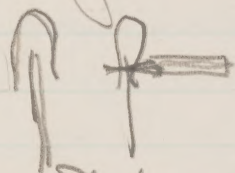
HCl put in inner tank. For electrolyte in outer. Anode fine gold in inner, cathode fine gold in outer. Anode to cathode 2". Current of 30 amps per sq. ft. cathode passed. Gold first deposited then Cu & palladium. Cathode washed in HNO_3 which dissolves both Cu & Pd leaving Au 995. Inner solution becomes as high as 300 gms per litre. For solution run until clear then used to ppt Au from Cathode washings then run in tanks of iron filings brine.

Copper plant

About 15% Cu SO_4 (3% Cu) in electrolyte, at 140° temp.

Circulation used, about $1\frac{3}{4}'$ anode to cathode.

Cathode started on oiled ^{hard rolled} copper (engine oil) stripped and suspended as follows. Edges

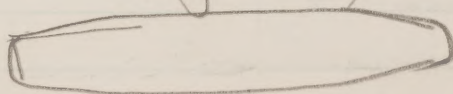


painted to facilitate stripping. Cathode about $2\frac{1}{2}$ ft. sq.

Current density about 1 amp per sq. ft.

Capacity about 15,000 lbs per year elect. copper.

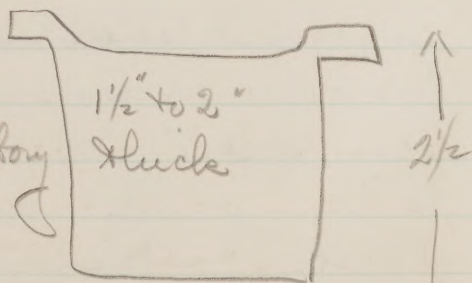
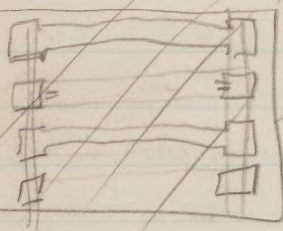
Cathode copper melted in reverberatory furnaces, poured and cast into bars for various purposes. These bars are of this shape



Plant itself —

Mr. Adcock is foreman or manager
and strict rules enforced and to
visitors. Plant run in good shape.
Visited only the Copper & Silver
refining where I saw and took a
peek in the generator room where
among other things were
four immense Crocker Wheeler
steam run dynamos of apparently
10,000 amperes each.

Bleeder copper of about 98% purity
melted and run into
anodes of the usual
size and shape.



Melted in reverberatory
furnace and
cast in cooling
pans, cooled $\approx 2\frac{1}{2}$

with water and raised in density.
Carried over faulces and set in
place by handing cranes.

Set in solution of as before
described which is heated with
steam in lead coils and circulated
by means of jet pumps.

Slimes from these leopards
faulces run off over to the
after being passed through a 20 mesh screen.
Silver Refiner where they are
allowed to settle. The clear solution
being run back to the copper plant.
Slimes then run into lead lined
faulces where they are treated with
nitric, heated with steam and
agitated with air. Mr. Hales
claiming the air in no way oxidizes
the copper. The slimes on returning
contain about 20% copper. After
the above treatment the slimes
run in and all copper is dissolved.

BARBACH

Feb 23 29

Newark, N. J.

90 silver cells 2' x 4' approx
wooden baskets,

10 in pipes, 9 in parallel

25 to 40 volts - 1500 ampere

30,000 - 25,000 oz silver produced

Three canvas rolls under barrel

for waste or more, one three

sheet removed with gold.

Canisters are gold & silver from

in pipes, changing very little time

as slabs under barrel.

Gold given a by-bye in H₂SO₄

and H₂SO₄ bath.

About 8000 oz gold for waste

is put forth.

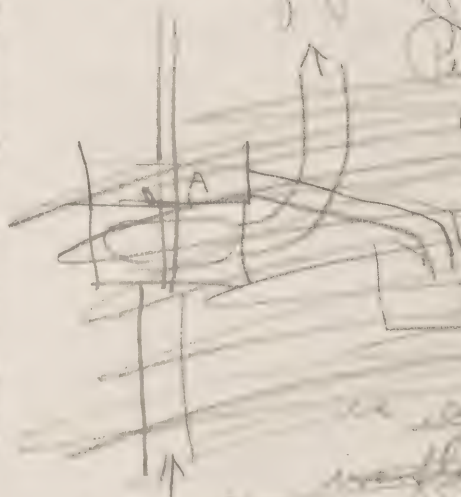
Barbache are similar to our southern

wave Barbache.

Copper

Electrolyte contains about
4% Cu and 16% H_2SO_4 from
at a temp of 120° and
kept circulating by novel
centrifugal pump.

See under Random notes



Pump for lead
lined and is
not packed
at A where
B there

is a corner the
weathering was
down to B. Electrolyte
having raised 17 ft and from
low to dark lead.
given no trouble.

Cement density and volume
from 21 to 22 pounds per cu
ft. Distance between
anode - cathode about 2"

Copper (Cont)

Maximum production 65 tons
elect. copper per day. Present
output 65 tons per day.

Cathodes started on band
rolled copper coated with
sheepskin grease & graphite
with wooden frame
plate to keep clean edges
and give them a roll of
plate to facilitate the
breaking.



Grids cast in usual form
by various patent & other
patenting firms.

Copper shipped as cathodes
without melting. Cathodes
shipped in boxes and by
barrels and.

The cathodes are shipped
to market without melting.

The foreman said the addition
of a trace of H_2O will
change the character of
the deposited copper. He had
added 15 lbs to the tank of solution
in the plant which produced
a marked effect.

Plant —

Large lead, silver, gold and
other coloring.

Very little ore handled. There
are few small blast furnaces
and several ^{small} reverberatory furnaces.
Lead is prepared with ^{flux} which
which is not present in
from each bar.

Purifier is used in some
cases to facilitate smelting.

Crocker-Hecker generators mostly
used

Plant itself in quite good condition
as for work but strict rules not
as rigidly enforced.

Lead refining

And lead melted in crucible
by aid of oil when the carbon
and arsenic are removed the
latter going off mostly as
fumes. The latter being removed
off as fumes. Any copper would
be left as dross on heat of
refining.

Then drawn to ⁴⁰⁰⁰ ~~4000~~ ⁵⁰ ~~50~~ ⁷⁰ ~~70~~ ¹⁰⁰ ~~100~~ ¹⁵⁰ ~~150~~ ²⁰⁰ ~~200~~ ²⁵⁰ ~~250~~ ³⁰⁰ ~~300~~ ³⁵⁰ ~~350~~ ⁴⁰⁰ ~~400~~ ⁴⁵⁰ ~~450~~ ⁵⁰⁰ ~~500~~ ⁵⁵⁰ ~~550~~ ⁶⁰⁰ ~~600~~ ⁶⁵⁰ ~~650~~ ⁷⁰⁰ ~~700~~ ⁷⁵⁰ ~~750~~ ⁸⁰⁰ ~~800~~ ⁸⁵⁰ ~~850~~ ⁹⁰⁰ ~~900~~ ⁹⁵⁰ ~~950~~ ¹⁰⁰⁰ ~~1000~~ ¹⁰⁵⁰ ~~1050~~ ¹¹⁰⁰ ~~1100~~ ¹¹⁵⁰ ~~1150~~ ¹²⁰⁰ ~~1200~~ ¹²⁵⁰ ~~1250~~ ¹³⁰⁰ ~~1300~~ ¹³⁵⁰ ~~1350~~ ¹⁴⁰⁰ ~~1400~~ ¹⁴⁵⁰ ~~1450~~ ¹⁵⁰⁰ ~~1500~~ ¹⁵⁵⁰ ~~1550~~ ¹⁶⁰⁰ ~~1600~~ ¹⁶⁵⁰ ~~1650~~ ¹⁷⁰⁰ ~~1700~~ ¹⁷⁵⁰ ~~1750~~ ¹⁸⁰⁰ ~~1800~~ ¹⁸⁵⁰ ~~1850~~ ¹⁹⁰⁰ ~~1900~~ ¹⁹⁵⁰ ~~1950~~ ²⁰⁰⁰ ~~2000~~ ²⁰⁵⁰ ~~2050~~ ²¹⁰⁰ ~~2100~~ ²¹⁵⁰ ~~2150~~ ²²⁰⁰ ~~2200~~ ²²⁵⁰ ~~2250~~ ²³⁰⁰ ~~2300~~ ²³⁵⁰ ~~2350~~ ²⁴⁰⁰ ~~2400~~ ²⁴⁵⁰ ~~2450~~ ²⁵⁰⁰ ~~2500~~ ²⁵⁵⁰ ~~2550~~ ²⁶⁰⁰ ~~2600~~ ²⁶⁵⁰ ~~2650~~ ²⁷⁰⁰ ~~2700~~ ²⁷⁵⁰ ~~2750~~ ²⁸⁰⁰ ~~2800~~ ²⁸⁵⁰ ~~2850~~ ²⁹⁰⁰ ~~2900~~ ²⁹⁵⁰ ~~2950~~ ³⁰⁰⁰ ~~3000~~ ³⁰⁵⁰ ~~3050~~ ³¹⁰⁰ ~~3100~~ ³¹⁵⁰ ~~3150~~ ³²⁰⁰ ~~3200~~ ³²⁵⁰ ~~3250~~ ³³⁰⁰ ~~3300~~ ³³⁵⁰ ~~3350~~ ³⁴⁰⁰ ~~3400~~ ³⁴⁵⁰ ~~3450~~ ³⁵⁰⁰ ~~3500~~ ³⁵⁵⁰ ~~3550~~ ³⁶⁰⁰ ~~3600~~ ³⁶⁵⁰ ~~3650~~ ³⁷⁰⁰ ~~3700~~ ³⁷⁵⁰ ~~3750~~ ³⁸⁰⁰ ~~3800~~ ³⁸⁵⁰ ~~3850~~ ³⁹⁰⁰ ~~3900~~ ³⁹⁵⁰ ~~3950~~ ⁴⁰⁰⁰ ~~4000~~ ⁴⁰⁵⁰ ~~4050~~ ⁴¹⁰⁰ ~~4100~~ ⁴¹⁵⁰ ~~4150~~ ⁴²⁰⁰ ~~4200~~ ⁴²⁵⁰ ~~4250~~ ⁴³⁰⁰ ~~4300~~ ⁴³⁵⁰ ~~4350~~ ⁴⁴⁰⁰ ~~4400~~ ⁴⁴⁵⁰ ~~4450~~ ⁴⁵⁰⁰ ~~4500~~ ⁴⁵⁵⁰ ~~4550~~ ⁴⁶⁰⁰ ~~4600~~ ⁴⁶⁵⁰ ~~4650~~ ⁴⁷⁰⁰ ~~4700~~ ⁴⁷⁵⁰ ~~4750~~ ⁴⁸⁰⁰ ~~4800~~ ⁴⁸⁵⁰ ~~4850~~ ⁴⁹⁰⁰ ~~4900~~ ⁴⁹⁵⁰ ~~4950~~ ⁵⁰⁰⁰ ~~5000~~ ⁵⁰⁵⁰ ~~5050~~ ⁵¹⁰⁰ ~~5100~~ ⁵¹⁵⁰ ~~5150~~ ⁵²⁰⁰ ~~5200~~ ⁵²⁵⁰ ~~5250~~ ⁵³⁰⁰ ~~5300~~ ⁵³⁵⁰ ~~5350~~ ⁵⁴⁰⁰ ~~5400~~ ⁵⁴⁵⁰ ~~5450~~ ⁵⁵⁰⁰ ~~5500~~ ⁵⁵⁵⁰ ~~5550~~ ⁵⁶⁰⁰ ~~5600~~ ⁵⁶⁵⁰ ~~5650~~ ⁵⁷⁰⁰ ~~5700~~ ⁵⁷⁵⁰ ~~5750~~ ⁵⁸⁰⁰ ~~5800~~ ⁵⁸⁵⁰ ~~5850~~ ⁵⁹⁰⁰ ~~5900~~ ⁵⁹⁵⁰ ~~5950~~ ⁶⁰⁰⁰ ~~6000~~ ⁶⁰⁵⁰ ~~6050~~ ⁶¹⁰⁰ ~~6100~~ ⁶¹⁵⁰ ~~6150~~ ⁶²⁰⁰ ~~6200~~ ⁶²⁵⁰ ~~6250~~ ⁶³⁰⁰ ~~6300~~ ⁶³⁵⁰ ~~6350~~ ⁶⁴⁰⁰ ~~6400~~ ⁶⁴⁵⁰ ~~6450~~ ⁶⁵⁰⁰ ~~6500~~ ⁶⁵⁵⁰ ~~6550~~ ⁶⁶⁰⁰ ~~6600~~ ⁶⁶⁵⁰ ~~6650~~ ⁶⁷⁰⁰ ~~6700~~ ⁶⁷⁵⁰ ~~6750~~ ⁶⁸⁰⁰ ~~6800~~ ⁶⁸⁵⁰ ~~6850~~ ⁶⁹⁰⁰ ~~6900~~ ⁶⁹⁵⁰ ~~6950~~ ⁷⁰⁰⁰ ~~7000~~ ⁷⁰⁵⁰ ~~7050~~ ⁷¹⁰⁰ ~~7100~~ ⁷¹⁵⁰ ~~7150~~ ⁷²⁰⁰ ~~7200~~ ⁷²⁵⁰ ~~7250~~ ⁷³⁰⁰ ~~7300~~ ⁷³⁵⁰ ~~7350~~ ⁷⁴⁰⁰ ~~7400~~ ⁷⁴⁵⁰ ~~7450~~ ⁷⁵⁰⁰ ~~7500~~ ⁷⁵⁵⁰ ~~7550~~ ⁷⁶⁰⁰ ~~7600~~ ⁷⁶⁵⁰ ~~7650~~ ⁷⁷⁰⁰ ~~7700~~ ⁷⁷⁵⁰ ~~7750~~ ⁷⁸⁰⁰ ~~7800~~ ⁷⁸⁵⁰ ~~7850~~ ⁷⁹⁰⁰ ~~7900~~ ⁷⁹⁵⁰ ~~7950~~ ⁸⁰⁰⁰ ~~8000~~ ⁸⁰⁵⁰ ~~8050~~ ⁸¹⁰⁰ ~~8100~~ ⁸¹⁵⁰ ~~8150~~ ⁸²⁰⁰ ~~8200~~ ⁸²⁵⁰ ~~8250~~ ⁸³⁰⁰ ~~8300~~ ⁸³⁵⁰ ~~8350~~ ⁸⁴⁰⁰ ~~8400~~ ⁸⁴⁵⁰ ~~8450~~ ⁸⁵⁰⁰ ~~8500~~ ⁸⁵⁵⁰ ~~8550~~ ⁸⁶⁰⁰ ~~8600~~ ⁸⁶⁵⁰ ~~8650~~ ⁸⁷⁰⁰ ~~8700~~ ⁸⁷⁵⁰ ~~8750~~ ⁸⁸⁰⁰ ~~8800~~ ⁸⁸⁵⁰ ~~8850~~ ⁸⁹⁰⁰ ~~8900~~ ⁸⁹⁵⁰ ~~8950~~ ⁹⁰⁰⁰ ~~9000~~ ⁹⁰⁵⁰ ~~9050~~ ⁹¹⁰⁰ ~~9100~~ ⁹¹⁵⁰ ~~9150~~ ⁹²⁰⁰ ~~9200~~ ⁹²⁵⁰ ~~9250~~ ⁹³⁰⁰ ~~9300~~ ⁹³⁵⁰ ~~9350~~ ⁹⁴⁰⁰ ~~9400~~ ⁹⁴⁵⁰ ~~9450~~ ⁹⁵⁰⁰ ~~9500~~ ⁹⁵⁵⁰ ~~9550~~ ⁹⁶⁰⁰ ~~9600~~ ⁹⁶⁵⁰ ~~9650~~ ⁹⁷⁰⁰ ~~9700~~ ⁹⁷⁵⁰ ~~9750~~ ⁹⁸⁰⁰ ~~9800~~ ⁹⁸⁵⁰ ~~9850~~ ⁹⁹⁰⁰ ~~9900~~ ⁹⁹⁵⁰ ~~9950~~ ¹⁰⁰⁰⁰ ~~10000~~ ¹⁰⁰⁵⁰ ~~10050~~ ¹⁰¹⁰⁰ ~~10100~~ ¹⁰¹⁵⁰ ~~10150~~ ¹⁰²⁰⁰ ~~10200~~ ¹⁰²⁵⁰ ~~10250~~ ¹⁰³⁰⁰ ~~10300~~ ¹⁰³⁵⁰ ~~10350~~ ¹⁰⁴⁰⁰ ~~10400~~ ¹⁰⁴⁵⁰ ~~10450~~ ¹⁰⁵⁰⁰ ~~10500~~ ¹⁰⁵⁵⁰ ~~10550~~ ¹⁰⁶⁰⁰ ~~10600~~ ¹⁰⁶⁵⁰ ~~10650~~ ¹⁰⁷⁰⁰ ~~10700~~ ¹⁰⁷⁵⁰ ~~10750~~ ¹⁰⁸⁰⁰ ~~10800~~ ¹⁰⁸⁵⁰ ~~10850~~ ¹⁰⁹⁰⁰ ~~10900~~ ¹⁰⁹⁵⁰ ~~10950~~ ¹¹⁰⁰⁰ ~~11000~~ ¹¹⁰⁵⁰ ~~11050~~ ¹¹¹⁰⁰ ~~11100~~ ¹¹¹⁵⁰ ~~11150~~ ¹¹²⁰⁰ ~~11200~~ ¹¹²⁵⁰ ~~11250~~ ¹¹³⁰⁰ ~~11300~~ ¹¹³⁵⁰ ~~11350~~ ¹¹⁴⁰⁰ ~~11400~~ ¹¹⁴⁵⁰ ~~11450~~ ¹¹⁵⁰⁰ ~~11500~~ ¹¹⁵⁵⁰ ~~11550~~ ¹¹⁶⁰⁰ ~~11600~~ ¹¹⁶⁵⁰ ~~11650~~ ¹¹⁷⁰⁰ ~~11700~~ ¹¹⁷⁵⁰ ~~11750~~ ¹¹⁸⁰⁰ ~~11800~~ ¹¹⁸⁵⁰ ~~11850~~ ¹¹⁹⁰⁰ ~~11900~~ ¹¹⁹⁵⁰ ~~11950~~ ¹²⁰⁰⁰ ~~12000~~ ¹²⁰⁵⁰ ~~12050~~ ¹²¹⁰⁰ ~~12100~~ ¹²¹⁵⁰ ~~12150~~ ¹²²⁰⁰ ~~12200~~ ¹²²⁵⁰ ~~12250~~ ¹²³⁰⁰ ~~12300~~ ¹²³⁵⁰ ~~12350~~ ¹²⁴⁰⁰ ~~12400~~ ¹²⁴⁵⁰ ~~12450~~ ¹²⁵⁰⁰ ~~12500~~ ¹²⁵⁵⁰ ~~12550~~ ¹²⁶⁰⁰ ~~12600~~ ¹²⁶⁵⁰ ~~12650~~ ¹²⁷⁰⁰ ~~12700~~ ¹²⁷⁵⁰ ~~12750~~ ¹²⁸⁰⁰ ~~12800~~ ¹²⁸⁵⁰ ~~12850~~ ¹²⁹⁰⁰ ~~12900~~ ¹²⁹⁵⁰ ~~12950~~ ¹³⁰⁰⁰ ~~13000~~ ¹³⁰⁵⁰ ~~13050~~ ¹³¹⁰⁰ ~~13100~~ ¹³¹⁵⁰ ~~13150~~ ¹³²⁰⁰ ~~13200~~ ¹³²⁵⁰ ~~13250~~ ¹³³⁰⁰ ~~13300~~ ¹³³⁵⁰ ~~13350~~ ¹³⁴⁰⁰ ~~13400~~ ¹³⁴⁵⁰ ~~13450~~ ¹³⁵⁰⁰ ~~13500~~ ¹³⁵⁵⁰ ~~13550~~ ¹³⁶⁰⁰ ~~13600~~ ¹³⁶⁵⁰ ~~13650~~ ¹³⁷⁰⁰ ~~13700~~ ¹³⁷⁵⁰ ~~13750~~ ¹³⁸⁰⁰ ~~13800~~ ¹³⁸⁵⁰ ~~13850~~ ¹³⁹⁰⁰ ~~13900~~ ¹³⁹⁵⁰ ~~13950~~ ¹⁴⁰⁰⁰ ~~14000~~ ¹⁴⁰⁵⁰ ~~14050~~ ¹⁴¹⁰⁰ ~~14100~~ ¹⁴¹⁵⁰ ~~14150~~ ¹⁴²⁰⁰ ~~14200~~ ¹⁴²⁵⁰ ~~14250~~ ¹⁴³⁰⁰ ~~14300~~ ¹⁴³⁵⁰ ~~14350~~ ¹⁴⁴⁰⁰ ~~14400~~ ¹⁴⁴⁵⁰ ~~14450~~ ¹⁴⁵⁰⁰ ~~14500~~ ¹⁴⁵⁵⁰ ~~14550~~ ¹⁴⁶⁰⁰ ~~14600~~ ¹⁴⁶⁵⁰ ~~14650~~ ¹⁴⁷⁰⁰ ~~14700~~ ¹⁴⁷⁵⁰ ~~14750~~ ¹⁴⁸⁰⁰ ~~14800~~ ¹⁴⁸⁵⁰ ~~14850~~ ¹⁴⁹⁰⁰ ~~14900~~ ¹⁴⁹⁵⁰ ~~14950~~ ¹⁵⁰⁰⁰ ~~15000~~ ¹⁵⁰⁵⁰ ~~15050~~ ¹⁵¹⁰⁰ ~~15100~~ ¹⁵¹⁵⁰ ~~15150~~ ¹⁵²⁰⁰ ~~15200~~ ¹⁵²⁵⁰ ~~15250~~ ¹⁵³⁰⁰ ~~15300~~ ¹⁵³⁵⁰ ~~15350~~ ¹⁵⁴⁰⁰ ~~15400~~ ¹⁵⁴⁵⁰ ~~15450~~ ¹⁵⁵⁰⁰ ~~15500~~ ¹⁵⁵⁵⁰ ~~15550~~ ¹⁵⁶⁰⁰ ~~15600~~ ¹⁵⁶⁵⁰ ~~15650~~ ¹⁵⁷⁰⁰ ~~15700~~ ¹⁵⁷⁵⁰ ~~15750~~ ¹⁵⁸⁰⁰ ~~15800~~ ¹⁵⁸⁵⁰ ~~15850~~ ¹⁵⁹⁰⁰ ~~15900~~ ¹⁵⁹⁵⁰ ~~15950~~ ¹⁶⁰⁰⁰ ~~16000~~ ¹⁶⁰⁵⁰ ~~16050~~ ¹⁶¹⁰⁰ ~~16100~~ ¹⁶¹⁵⁰ ~~16150~~ ¹⁶²⁰⁰ ~~16200~~ ¹⁶²⁵⁰ ~~16250~~ ¹⁶³⁰⁰ ~~16300~~ ¹⁶³⁵⁰ ~~16350~~ ¹⁶⁴⁰⁰ ~~16400~~ ¹⁶⁴⁵⁰ ~~16450~~ ¹⁶⁵⁰⁰ ~~16500~~ ¹⁶⁵⁵⁰ ~~16550~~ ¹⁶⁶⁰⁰ ~~16600~~ ¹⁶⁶⁵⁰ ~~16650~~ ¹⁶⁷⁰⁰ ~~16700~~ ¹⁶⁷⁵⁰ ~~16750~~ ¹⁶⁸⁰⁰ ~~16800~~ ¹⁶⁸⁵⁰ ~~16850~~ ¹⁶⁹⁰⁰ ~~16900~~ ¹⁶⁹⁵⁰ ~~16950~~ ¹⁷⁰⁰⁰ ~~17000~~ ¹⁷⁰⁵⁰ ~~17050~~ ¹⁷¹⁰⁰ ~~17100~~ ¹⁷¹⁵⁰ ~~17150~~ ¹⁷²⁰⁰ ~~17200~~ ¹⁷²⁵⁰ ~~17250~~ ¹⁷³⁰⁰ ~~17300~~ ¹⁷³⁵⁰ ~~17350~~ ¹⁷⁴⁰⁰ ~~17400~~ ¹⁷⁴⁵⁰ ~~17450~~ ¹⁷⁵⁰⁰ ~~17500~~ ¹⁷⁵⁵⁰ ~~17550~~ ¹⁷⁶⁰⁰ ~~17600~~ ¹⁷⁶⁵⁰ ~~17650~~ ¹⁷⁷⁰⁰ ~~17700~~ ¹⁷⁷⁵⁰ ~~17750~~ ¹⁷⁸⁰⁰ ~~17800~~ ¹⁷⁸⁵⁰ ~~17850~~ ¹⁷⁹⁰⁰ ~~17900~~ ¹⁷⁹⁵⁰ ~~17950~~ ¹⁸⁰⁰⁰ ~~18000~~ ¹⁸⁰⁵⁰ ~~18050~~ ¹⁸¹⁰⁰ ~~18100~~ ¹⁸¹⁵⁰ ~~18150~~ ¹⁸²⁰⁰ ~~18200~~ ¹⁸²⁵⁰ ~~18250~~ ¹⁸³⁰⁰ ~~18300~~ ¹⁸³⁵⁰ ~~18350~~ ¹⁸⁴⁰⁰ ~~18400~~ ¹⁸⁴⁵⁰ ~~18450~~ ¹⁸⁵⁰⁰ ~~18500~~ ¹⁸⁵⁵⁰ ~~18550~~ ¹⁸⁶⁰⁰ ~~18600~~ ¹⁸⁶⁵⁰ ~~18650~~ ¹⁸⁷⁰⁰ ~~18700~~ ¹⁸⁷⁵⁰ ~~18750~~ ¹⁸⁸⁰⁰ ~~18800~~ ¹⁸⁸⁵⁰ ~~18850~~ ¹⁸⁹⁰⁰ ~~18900~~ ¹⁸⁹⁵⁰ ~~18950~~ ¹⁹⁰⁰⁰ ~~19000~~ ¹⁹⁰⁵⁰ ~~19050~~ ¹⁹¹⁰⁰ ~~19100~~ ¹⁹¹⁵⁰ ~~19150~~ ¹⁹²⁰⁰ ~~19200~~ ¹⁹²⁵⁰ ~~19250~~ ¹⁹³⁰⁰ ~~19300~~ ¹⁹³⁵⁰ ~~19350~~ ¹⁹⁴⁰⁰ ~~19400~~ ¹⁹⁴⁵⁰ ~~19450~~ ¹⁹⁵⁰⁰ ~~19500~~ ¹⁹⁵⁵⁰ ~~19550~~ ¹⁹⁶⁰⁰ ~~19600~~ ¹⁹⁶⁵⁰ ~~19650~~ ¹⁹⁷⁰⁰ ~~19700~~ ¹⁹⁷⁵⁰ ~~19750~~ ¹⁹⁸⁰⁰ ~~19800~~ ¹⁹⁸⁵⁰ ~~19850~~ ¹⁹⁹⁰⁰ ~~19900~~ ¹⁹⁹⁵⁰ ~~19950~~ ²⁰⁰⁰⁰ ~~20000~~ ²⁰⁰⁵⁰ ~~20050~~ ²⁰¹⁰⁰ ~~20100~~ ²⁰¹⁵⁰ ~~20150~~ ²⁰²⁰⁰ ~~20200~~ ²⁰²⁵⁰ ~~20250~~ ²⁰³⁰⁰ ~~20300~~ ²⁰³⁵⁰ ~~20350~~ ²⁰⁴⁰⁰ ~~20400~~ ²⁰⁴⁵⁰ ~~20450~~ ²⁰⁵⁰⁰ ~~20500~~ ²⁰⁵⁵⁰ ~~20550~~ ²⁰⁶⁰⁰ ~~20600~~ ²⁰⁶⁵⁰ ~~20650~~ ²⁰⁷⁰⁰ ~~20700~~ ²⁰⁷⁵⁰ ~~20750~~ ²⁰⁸⁰⁰ ~~20800~~ ²⁰⁸⁵⁰ ~~20850~~ ²⁰⁹⁰⁰ ~~20900~~ ²⁰⁹⁵⁰ ~~20950~~ ²¹⁰⁰⁰ ~~21000~~ ²¹⁰⁵⁰ ~~21050~~ ²¹¹⁰⁰ ~~21100~~ ²¹¹⁵⁰ ~~21150~~ ²¹²⁰⁰ ~~21200~~ ²¹²⁵⁰ ~~21250~~ ²¹³⁰⁰ ~~21300~~ ²¹³⁵⁰ ~~21350~~ ²¹⁴⁰⁰ ~~21400~~ ²¹⁴⁵⁰ ~~21450~~ ²¹⁵⁰⁰ ~~21500~~ ²¹⁵⁵⁰ ~~21550~~ ²¹⁶⁰⁰ ~~21600~~ ²¹⁶⁵⁰ ~~21650~~ ²¹⁷⁰⁰ ~~21700~~ ²¹⁷⁵⁰ ~~21750~~ ²¹⁸⁰⁰ ~~21800~~ ²¹⁸⁵⁰ ~~21850~~ ²¹⁹⁰⁰ ~~21900~~ ²¹⁹⁵⁰ ~~21950~~ ²²⁰⁰⁰ ~~22000~~ ²²⁰⁵⁰ ~~22050~~ ²²¹⁰⁰ ~~22100~~ ²²¹⁵⁰ ~~22150~~ ²²²⁰⁰ ~~22200~~ ²²²⁵⁰ ~~22250~~ ²²³⁰⁰ ~~22300~~ ²²³⁵⁰ ~~22350~~ ²²⁴⁰⁰ ~~22400~~ ²²⁴⁵⁰ ~~22450~~ ²²⁵⁰⁰ ~~22500~~ ²²⁵⁵⁰ ~~22550~~ ²²⁶⁰⁰ ~~22600~~ ²²⁶⁵⁰ ~~22650~~ ²²⁷⁰⁰ ~~22700~~ ²²⁷⁵⁰ ~~22750~~ ²²⁸⁰⁰ ~~22800~~ ²²⁸⁵⁰ ~~22850~~ ²²⁹⁰⁰ ~~22900~~ ²²⁹⁵⁰ ~~22950~~ ²³⁰⁰⁰ ~~23000~~ ²³⁰⁵⁰ ~~23050~~ ²³¹⁰⁰ ~~23100~~ ²³¹⁵⁰ ~~23150~~ ²³²⁰⁰ ~~23200~~ ²³²⁵⁰ ~~23250~~ ²³³⁰⁰ ~~23300~~ ²³³⁵⁰ ~~23350~~ ²³⁴⁰⁰ ~~23400~~ ²³⁴⁵⁰ ~~23450~~ ²³⁵⁰⁰ ~~23500~~ ²³⁵⁵⁰ ~~23550~~ ²³⁶⁰⁰ ~~23600~~ ²³⁶⁵⁰ ~~23650~~ ²³⁷⁰⁰ ~~23700~~ ²³⁷⁵⁰ ~~23750~~ ²³⁸⁰⁰ ~~23800~~ ²³⁸⁵⁰ ~~23850~~ ²³⁹⁰⁰ ~~23900~~ ²³⁹⁵⁰ ~~23950~~ ²⁴⁰⁰⁰ ~~24000~~ ²⁴⁰⁵⁰ ~~24050~~ ²⁴¹⁰⁰ ~~24100~~ ²⁴¹⁵⁰ ~~24150~~ ²⁴²⁰⁰ ~~24200~~ ²⁴²⁵⁰ ~~24250~~ ²⁴³⁰⁰ ~~24300~~ ²⁴³⁵⁰ ~~24350~~ ²⁴⁴⁰⁰ ~~24400~~ ²⁴⁴⁵⁰ ~~24450~~ ²⁴⁵⁰⁰ ~~24500~~ ²⁴⁵⁵⁰ ~~24550~~ ²⁴⁶⁰⁰ ~~24600~~ ²⁴⁶⁵⁰ ~~24650~~ ²⁴⁷⁰⁰ ~~24700~~ ²⁴⁷⁵⁰ ~~24750~~ ²⁴⁸⁰⁰ ~~24800~~ ²⁴⁸⁵⁰ ~~24850~~ ²⁴⁹⁰⁰ ~~24900~~ ²⁴⁹⁵⁰ ~~24950~~ ²⁵⁰⁰⁰ ~~25000~~ ²⁵⁰⁵⁰ ~~25050~~ ²⁵¹⁰⁰ ~~25100~~ ²⁵¹⁵⁰ ~~25150~~ ²⁵²⁰⁰ ~~25200~~ ²⁵²⁵⁰ ~~25250~~ ²⁵³⁰⁰ ~~25300~~ ²⁵³⁵⁰ ~~25350~~ ²⁵⁴⁰⁰ ~~25400~~ ²⁵⁴⁵⁰ ~~25450~~ ²⁵⁵⁰⁰ ~~25500~~ ²⁵⁵⁵⁰ ~~25550~~ ²⁵⁶⁰⁰ ~~25600~~ ²⁵⁶⁵⁰ ~~25650~~ ²⁵⁷⁰⁰ ~~25700~~ ²⁵⁷⁵⁰ ~~25750~~ ²⁵⁸⁰⁰ ~~25800~~ ²⁵⁸⁵⁰ ~~25850~~ ²⁵⁹⁰⁰ ~~25900~~ ²⁵⁹⁵⁰ ~~25950~~ ²⁶⁰⁰⁰ ~~26000~~ ²⁶⁰⁵⁰ ~~26050~~ ²⁶¹⁰⁰ ~~26100~~ ²⁶¹⁵⁰ ~~26150~~ ²⁶²⁰⁰ ~~26200~~ ²⁶²⁵⁰ ~~26250~~ ²⁶³⁰⁰ ~~26300~~ ²⁶³⁵⁰ ~~26350~~ ²⁶⁴⁰⁰ ~~26400~~ ²⁶⁴⁵⁰ ~~26450~~ ²⁶⁵⁰⁰ ~~26500~~ ²⁶⁵⁵⁰ ~~26550~~ ²⁶⁶⁰⁰ ~~26600~~ ²⁶⁶⁵⁰ ~~26650~~ ²⁶⁷⁰⁰ ~~26700~~ ²⁶⁷⁵⁰ ~~26750~~ ²⁶⁸⁰⁰ ~~26800~~ ²⁶⁸⁵⁰ ~~26850~~ ²⁶⁹⁰⁰ ~~26900~~ ²⁶⁹⁵⁰ ~~26950~~ ²⁷⁰⁰⁰ ~~27000~~ ²⁷⁰⁵⁰ ~~27050~~ ²⁷¹⁰⁰ ~~27100~~ ²⁷¹⁵⁰ ~~27150~~ ²⁷²⁰⁰ ~~27200~~ ²⁷²⁵⁰ ~~27250~~ ²⁷³⁰⁰ ~~27300~~ ²⁷³⁵⁰ ~~27350~~ ²⁷⁴⁰⁰ ~~27400~~ ²⁷⁴⁵⁰ ~~27450~~ ²⁷⁵⁰⁰ ~~27500~~ ²⁷⁵⁵⁰ ~~27550~~ ²⁷⁶⁰⁰ ~~27600~~ ²⁷⁶⁵⁰ ~~27650~~ ²⁷⁷⁰⁰ ~~27700~~ ²⁷⁷⁵⁰ ~~27750~~ ²⁷⁸⁰⁰ ~~27800~~ ²⁷⁸⁵⁰ ~~27850~~ ²⁷⁹⁰⁰ ~~27900~~ ²⁷⁹⁵⁰ ~~27950~~ ²⁸⁰⁰⁰ ~~28000~~ ²⁸⁰⁵⁰ ~~28050~~ ²⁸¹⁰⁰ ~~28100~~ ²⁸¹⁵⁰ ~~28150~~ ²⁸²⁰⁰ ~~28200~~ ²⁸²⁵⁰ ~~28250~~ ²⁸³⁰⁰ ~~28300~~ ²⁸³⁵⁰ ~~28350~~ ²⁸⁴⁰⁰ ~~28400~~ ²⁸⁴⁵⁰ ~~28450~~ ²⁸⁵⁰⁰ ~~28500~~ ²⁸⁵⁵⁰ ~~28550~~ ²⁸⁶⁰⁰ ~~28600~~ ²⁸⁶⁵⁰ ~~28650~~ ²⁸⁷⁰⁰ ~~28700~~

6/10/73 Zn required for reduction.
Pb. then run into pigs in
a pure state.

* The cakes from the retorted
go to the cupolas where oil
is used for fuel and are under
1200 (?) pressure is used for
oxidation. The fumes, say, vapors
are collected from the dust.
The litharge from the cupola is
run into a bucket of charcoal
where a large acid is reduced
to metallic lead. A good idea.

② This slide of antimony is
reduced in a separate retort,
enough of lead being present
to make an antimony lead
of about 10% as a product.

(1)



W.S. Metals Refining Co (Cont)

down to $\frac{1}{2}\%$. Slimes carried to filter press and washed the sludge being used for making up new solution (?)

After running from the press the slimes contain about 25% water, leaving them out of solution they carry 40 to 50% Silver and a small amount of gold. This is run in reverberatory with a salt cake flux and cast into anodes for the silver cells. Slag taken to the my kind furnace. Gases from above reverb. run through a scrubber made as follows



Sludge at clean up time carries 1500 gr silver per ton.

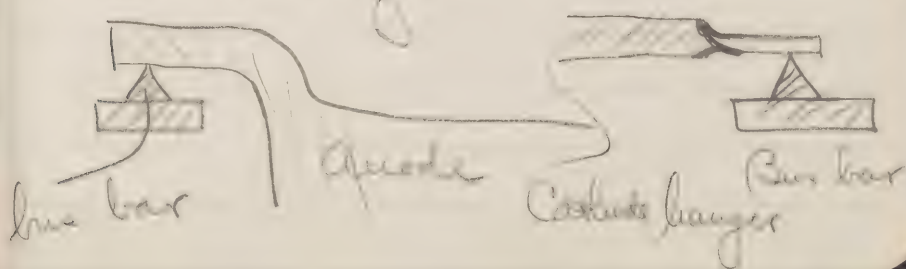
Anything would probably save some of this.

On account of frequency of acids
the solution remains in good
condition for a long space. The
acid is kept below 1%. When
low it is replenished in some
cases by means of steam in
coiled iron pipe. - I must
remember that to me.

Tanks used in leaching
plum are made of 1 1/2% acid
lead.

The silver produced carrying
as little as .02 g gold for ton
of silver.

The anodes and cathodes
are suspended in the copper
tanks thusly



A.S. & T.R. Co. Manure N. J.
Feb. 24th

Called to see Mr. E. Bush
the Asst. Investments Building
(17th floor, 21 elevators). Mr. Bush
being in Europe, saw Mr. Mann
who gave me letter to Holser.
He speaks on Blister copper and
Base bullion rather well. He
seems enough for flying their flags
and warring by products.
Employ about 1000 men and
produce 200 tons of copper
~~and~~ 100,000 lbs silver & 200 tons
lead pr. day.

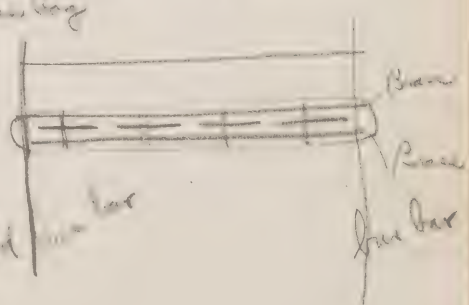
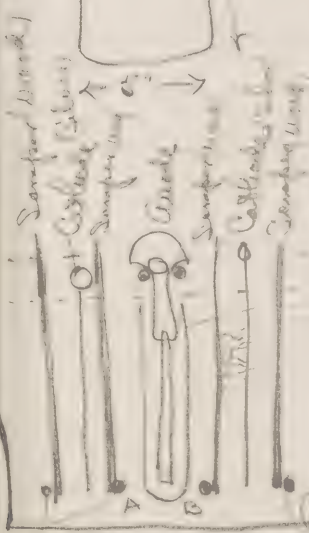
Visited the works Feb 25th
Met Mr. Pence the manager who
introduced me to Mr. Alexander who
in turn introduced me to Mr.
Emmanuel to whom I am
indebted for my information.

	Silver Cells	Copper Cells
Comp. Anode	98% Ag, 2% Zn	
Size tubes & material	2 1/2 x 2 1/2 in. Belling	
Current density in ft cathode	18 amp.	
Voltage per cell	1.6 to 1.7	
Distance an to cath. 4 mm. 2 inches	about 2"	
Less metal in electrolyte	1.1% Ag	
Free acid in electrolyte	10%	
Temperature	15°C	125°F
Drops used in solution	no drops	
Use of cells	144	
In series	144	
In parallel	0	

This is the first stand visited in
 which the verticle system is used.
 Five cathodes ~~and~~ and four lines
 of anodes placed in each tank.
 The latter in duck bags which last
 from 4 mos to 1 year. Cruders about
 this size & shape:



Indentation made in
 hanger point by a foot
 press ~~and the~~ to take
 the grip of the hangers.
 The whole thing being
 mounted on a very
 complicated frame which
 sets in the tanks.
 Canvas bag

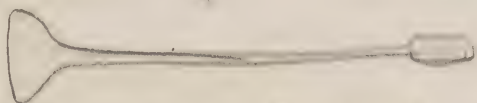


Sawed wooden guide Sawed wooden guide

The scraper makes a complete movement
in about 4 sec. and prevents dirt
penetrating by knocking off any fines
into the wooden box below. I

And prevents often occurring at A and B
(former sketches) which cause a
~~loss~~ of deposition of silver inside
the canvas bag with the gold.
I judge the gold loss not over
100 gms although I did not
get the correct figures.

The agitator is cleaned out
up three times a day (?) I should
have the frames anti-rusted. I
wash well by means of water &
steam and the rollers are
coated with iron tannin solution
of this shape: the roller



falling into the box from which it
C

is collected in large wooden bins
with false bottoms, washed by
means of suction, dried on a
drying pan made of sheet iron over
the fire from the silver melting
furnace, and melted in pots
of 25,000 gr capacity with fuel
(of coke). One retort being run
continuously and making five
or six melts per day, about 100,000
to 125,000 gr, some metal being
left in the retort each time as in
our regular work. In my notion there
is an ideal way to melt silver
the retort never being filled when
and the metal run directly into
molds when it is run. In some
Canadian retorts used and highly recommended
by Tennant who says the Indian people
could not make a start to melt them.
The fine silver produced comes about
60% gold for 1000 gr.

Gold collected every 2 days¹⁰ and the
cathode filters washed in tanks.
Gold boiled in HNO_3 & H_2SO_4
washed & melted in closed pot
in coke furnace, number 50 over
old one. HNO_3 used - bad gold
after given more silver and used
to renew electrolyte.

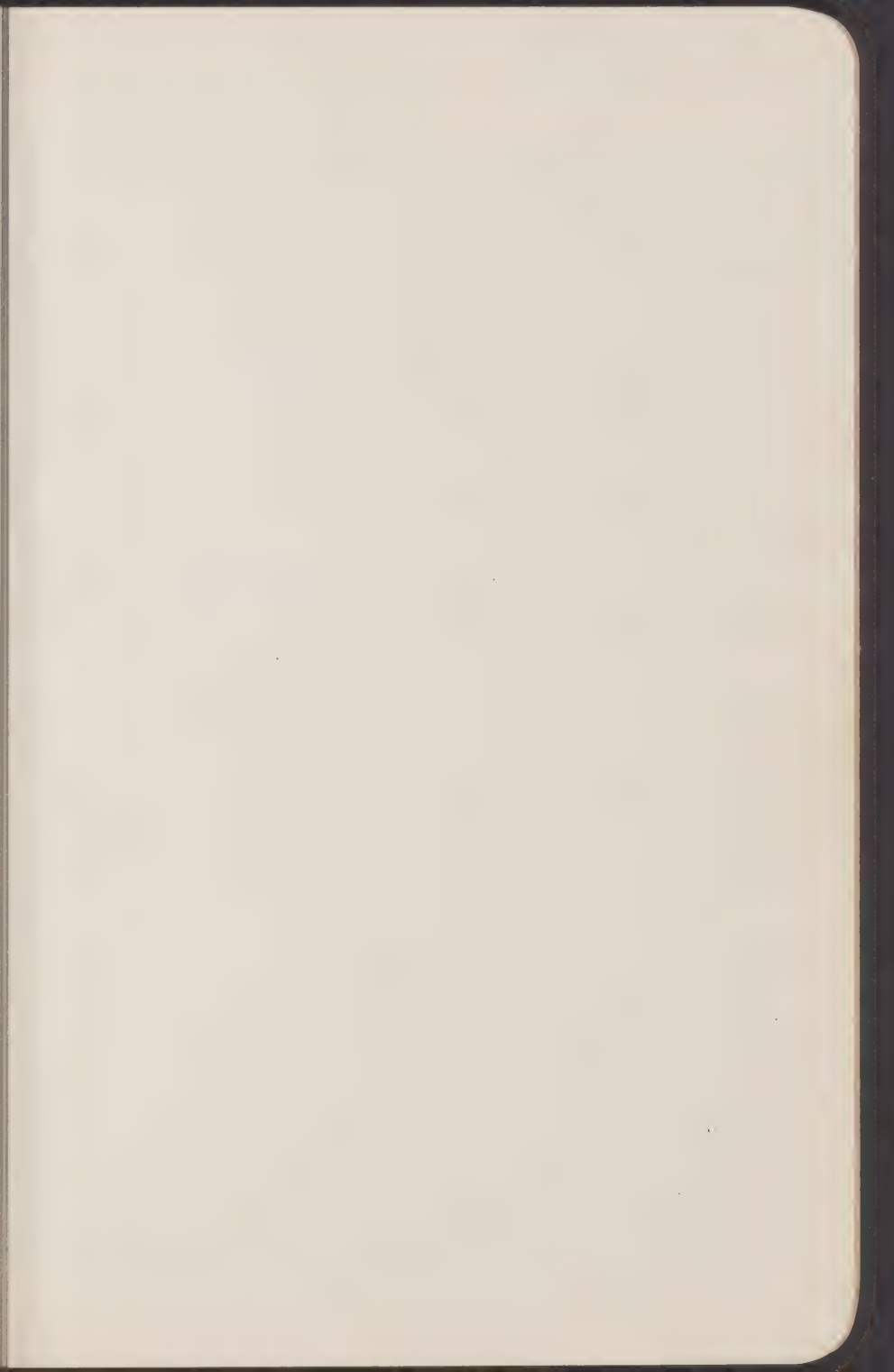
Old electrolyte drawn off in cathode
not all at once.

Either before or after the removal of
the silver it is sent to the waste
pots where it is dried and sent
to the blast furnace.

Cathodes greased to facilitate
the scraping.

Cathodes roughly 20" x 20"

About 2 or 2 1/2% anode scraps
recycled.



Tandan Copper Works Belle Airway N. J. Feb 20

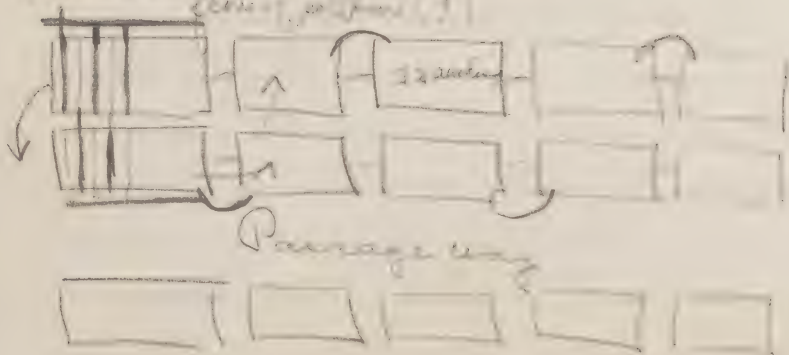
The Clerk superintendent

The Aldrich pit 4. Silver refiner
who showed me record of plant.

Clinton Copper mine now producing
handicraft. 700 men employed
400 tons elect copper per day
not sent, 45,000 by silver process.

Two copper tanks houses, the
larger 300 x 100 ft. producing
1600 tanks the other 1200
tanks. The larger and older
arranged in oblong rows
of two tanks lengthwise of them.

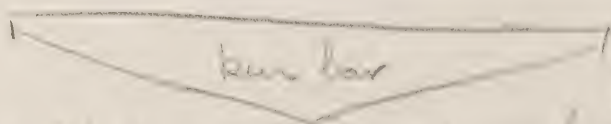
Arrows indicate the flow of current.
Flow of water



In the newer plant, connections
are made thus



about 10 ft. high



bus bar +

This method is economical so far as
floor space is concerned but necessitates the
use of working over the roof, etc. etc.

Horizontal

Silver

Copper

Cmp. anode

98% Ag

98% Cu

Size tank

2' x 4' x 8"

2' x 4' x 8"

cart remove

leak check, mod.

Current density

100 to 200 tanks

18 for 2 ft

An to Cathode

4 1/4"

2"

Current density
metal in
electrolyte

140 2% (?)

3%

Time used

2 1/2 to 3 1/2%

12%

Temperature

125°

Vol. solution

90

2400

In parallel

3

See series

30

Anode surface

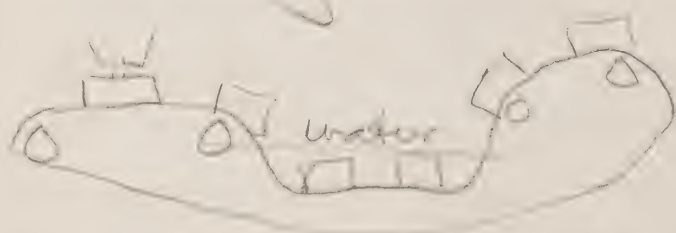
2 1/3 sq ft

Volts for cell

4 1/2

~~Section~~ Copper

Plaster copper melted in large
furnaces and cast into
under the means of welder
in working belt.

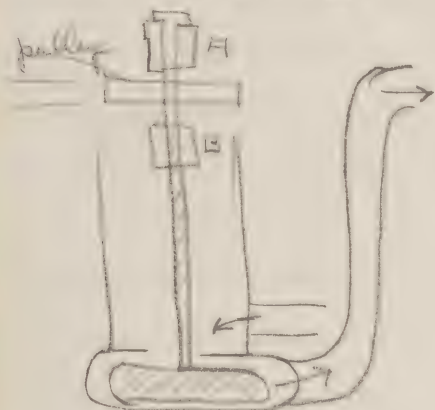


or in the various similar device
which are set in place by
board in the go into the harbor
after which they are banded in
a unit by large working crew.
Regiment about 27 days the steam
are under.

Shells made in hand rolled paper
pressed so small being on the
the same course but on found
copper rods.

Shells gathered in wheel barrels
underneath the tank house

floor, covered to pass 40 mesh
lead screen (4 lb lead - slotted)
and pumped to settling tanks,
by means of a centrifugal
pump of irregular design.



Lead faced sheet
draft completed
S.A. and C.
Sheet of run's
made of lead
lead.

Slimes agitated with nitric
acid are in cylindrical lead tank.
* Tanks for S.A. after leaving
the lead liquor decanted and
sent back to tank house. Then
they go to filter press where they
are washed. Before the treatment
they have 20% more pepper after

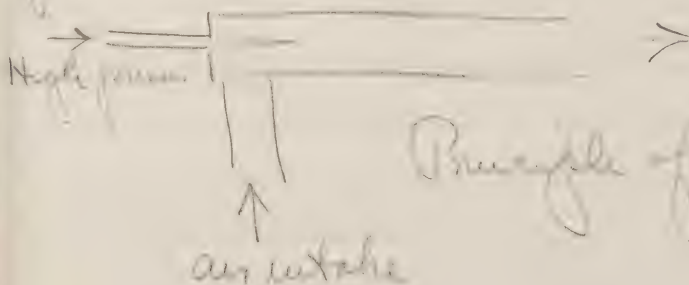
4. Fastened very little. After having
 like pump they will run 35%
 seconds. At the solid resistance
 50% more in power.

Without lubrication they are
 melted in good sized rough
 form of solid construction.



There is a poppet
 for the
 movable cylinder
 on each side.

A small amount of high pressure
 air being made the engine a large
 amount of low pressure air
 follows.



Principle of injector

Silver anodes cast in dumping
molds of somewhat their design



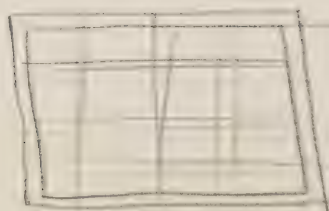
Horizontal system used. On
account of fine quality of
anodes solution becomes good
a long time. Withdrawing is
done little by little the end
solution being sent to the
silver tanks and agitated
with them the copper throwing
down the silver.

Mr. Aldrich says that the tendency
of his cells are to run down in
acid and up in nitrate and
that he adds acid every day or so

Gold is collected in Lake bottom
filings as is also the silver.

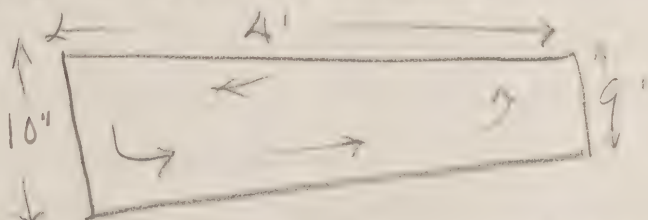
The silver is now being boiled
in both water and petroleum
before melted. Boiled water
from silver evaporating sent
to silver tanks. Silver
is handled with aluminum
scoops after which it is
melted in large pots by
means of oil. The proper
sort of retort as is used in
distilling zinc. It is not
excellent place.

In the basket also are thousands
of cloth as used which is
fastened in this manner



Inner frame to
hold cloth
(Compare with sketch)

The tanks are a little deeper
 on the end under the basket
 which is the same design
 which was supposed to have
~~as~~ a circulation.



approximate measurements.

Plain carbon used for cathodes.

Gold is scraped out of basket
 without cleaning it. Cloth
 lasts a long time.

In referring the tendency
of the solution to become
concentrated so that occasionally
lead plates are removed &
placed some of the effort
in solution.

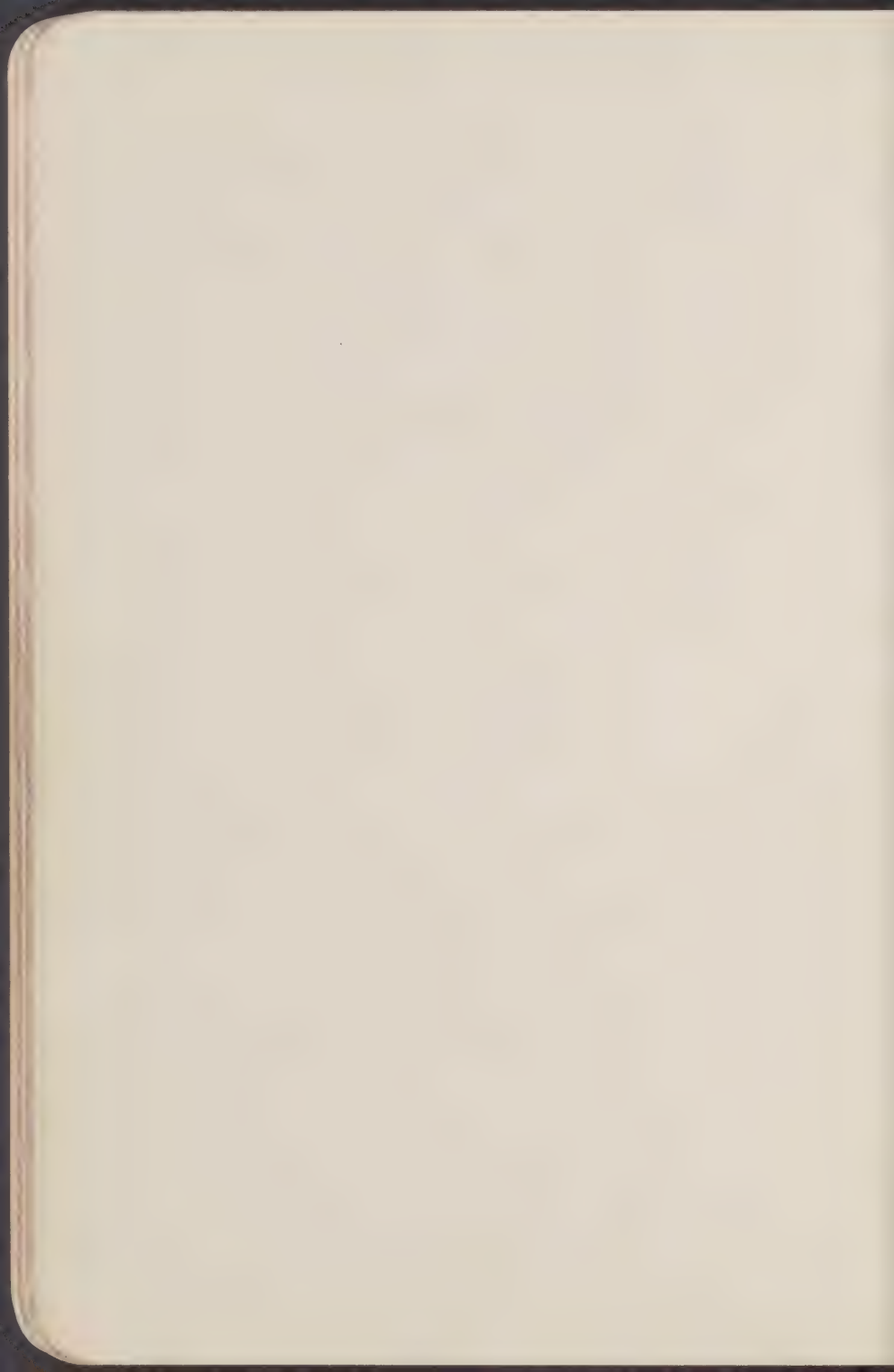
The power or juice for the old
plant furnished by five Hall
& Wood 750 N.P. 1000 volt engines
and on two G.E. and three
Westinghouse Generators.

For the new house there are four
Woodbury 800 N.P. 1000 volt engines
of the Corliss type running
G.E. generators of 6000 amps.
and 145 volts each.

Coal used for fuel and juice
estimated at cost $\frac{1}{4}$ to $\frac{1}{3}$ cents
per K.W. hour.

Cathodes ^{copper} are all melted in
reverberating furnace, coal
fuel, size 25' by 17' inside
measurements, spoked and
cast into merchant bars.
From each lot of iron bars
a sample is taken, drawn
into wire and tested for
conductivity, strength etc.
The molds for casting these bars
are made of copper and
Herb's of the furnace room
tells me 1,200,000 lbs of copper
are used up in molds alone.
The molds are made by forcing
four in of the desired size
into molten copper.

* Sluices are operated with water
until about 4:30 P.M. is found useful.
These new back sluices are run as
until all H₂O is thrown down, after
which they are stopped.



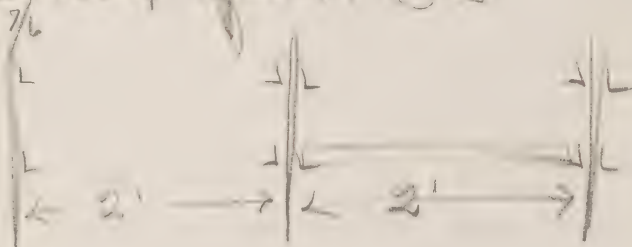
New York Assay Office
Dec. 27th

About 40 deposits per day received
and melted.

Much fine gold, sold.

Steel shelves in vauets for years.

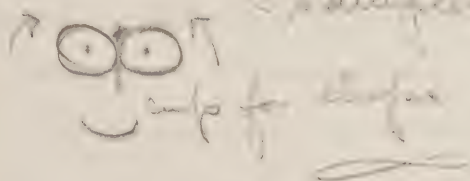
$\frac{7}{16}$ " uprights extending small angles
shelves 4" apart.



Squidre & Bodford crucible used
but Dixon is thought to be
superior by the foreman.

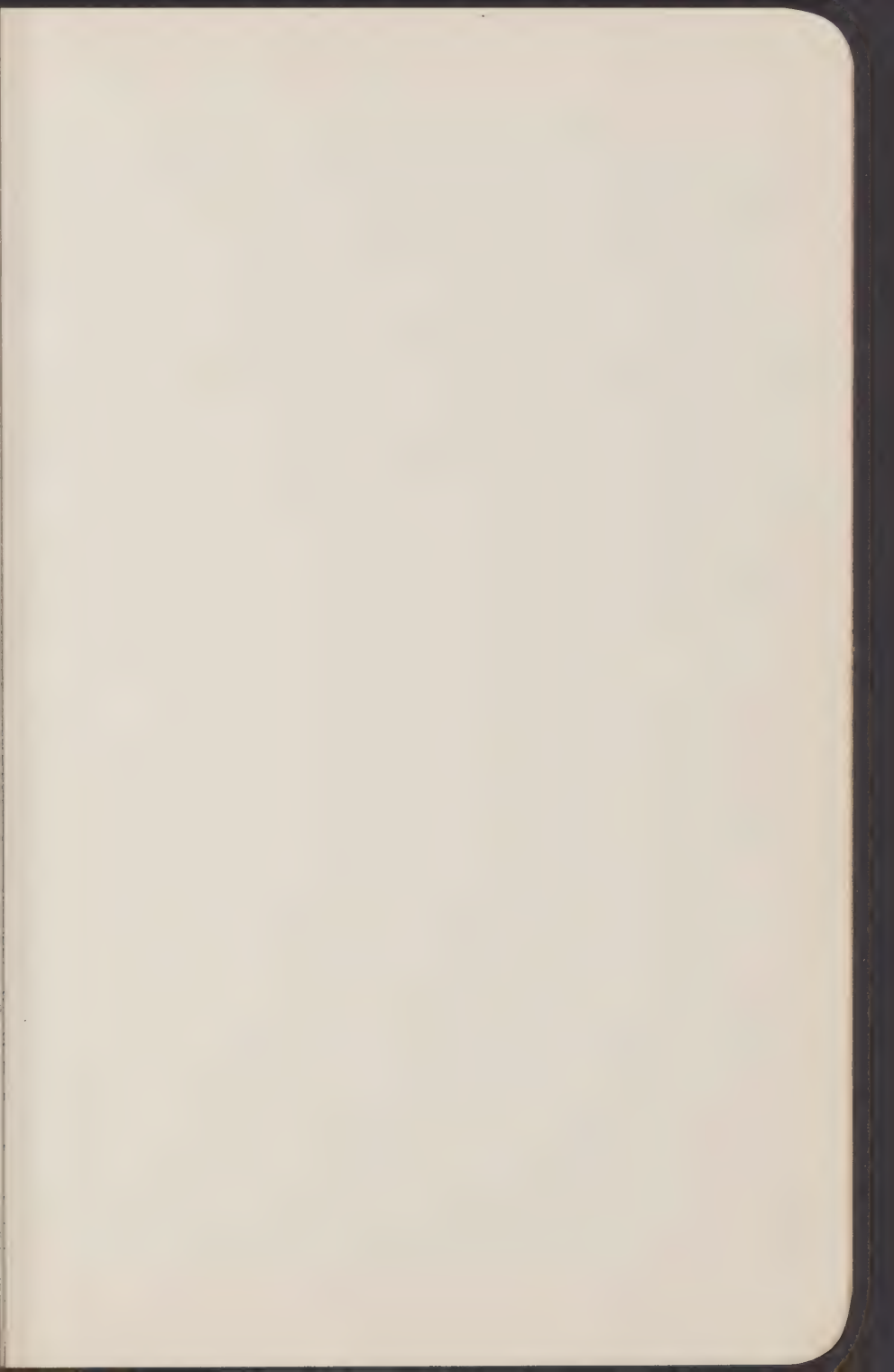
Mr Taylor of the assay dept. says
Mr Melby has run a refining
cupel for years and understands
its good and bad points.

In the area left the chips
are taken by a chipping machine,
marked by hydraulic presses
and rolled by horizontal rolls
thru : plasticity for bottle
samples.



Cups placed on fire brick and
put in furnace in water.
Then removed are cooled in the
water when red hot.

A good deal of bone billion is
received. Storage of unsorted
bone about 1000



Phosphorus Metal

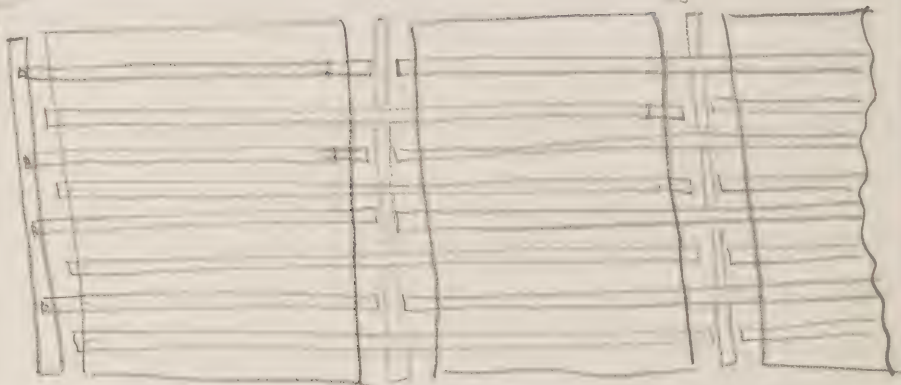
In making metal ingots, metal & copper are melted together in about 3200 g melted. Silicon clippings are added from 3 to 12 g. Copper-silicon (10%) are added and well stirred. The mass, care of the sides in the mold and gives a fine soft ingot.

Gold Cells

Connection

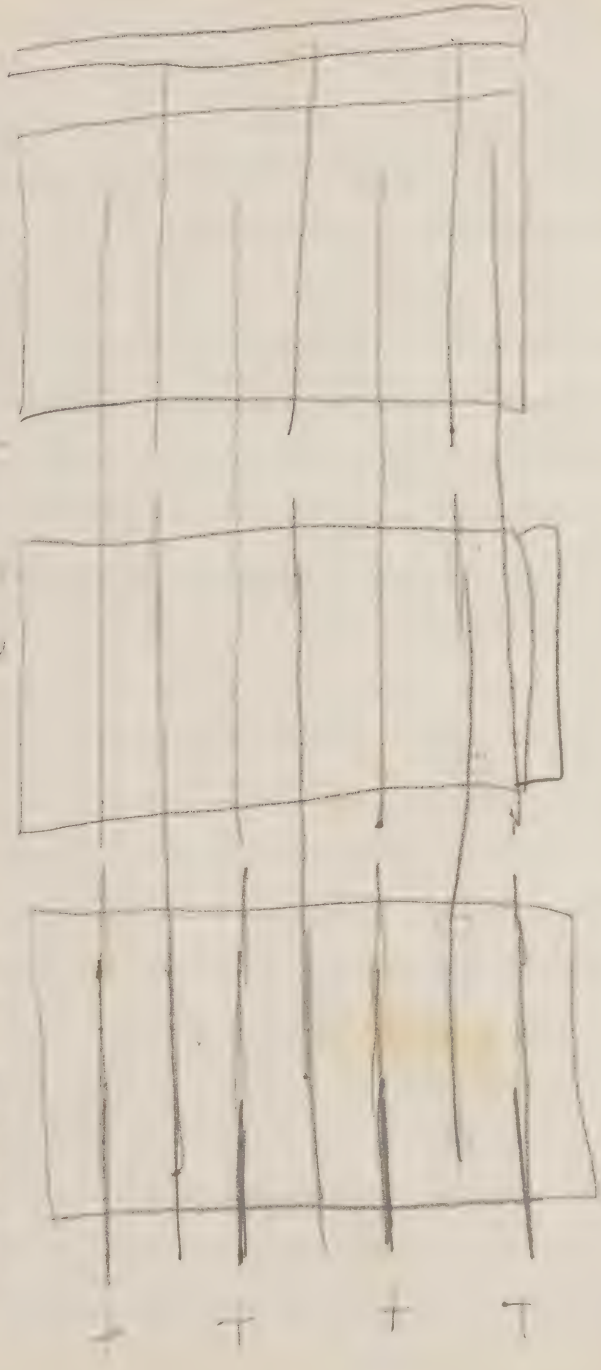
Disconnector

Disconnector



Rods are hard rubber tubes about $\frac{3}{8}$ " diameter reinforced by steel rods with nuts on ends (a good design). Strips of gold held on these rods by means of rubber bands (sections of rubber tube). System has advantage of very easily removing the conductors for cleaning the tubes — the disadvantage of not economizing on space, an anode being on one end of each tube.

Sketch of tanks used in factories for distillation, where
 condenser held in rubber side by side of rubber bands.



Distillation, industrial form
 1. Dist. $\approx 1/10$ Cg to $1/10$ gallon per hour
 10, 10, 10

Recovery of Platinum.

Platinum is p.p.c. from foul gold electrolyte with Ammonium Chloride (?) washed and ignited. Pressed into cakes which are made the anode and put into chloride solution as gold chloride is made by means of gold anode in same job. Then p.p.c. with NH_4Cl ignited and the sponge Pt gold.

As much as 1200 oz (?) of Pt. are saved fr. wear. This was formerly lost both to depositors & government as when alloyed with 50 or more parts of silver it is soluble in HNO_3 and in the majority of cases the proportion of silver in the assay would be greater than this. $\odot$

In N.Y. some deposits contained as much as 200 parts Pt. which the depositor got knowing he would get nothing for it. $\odot$



Recovery of Palladium

After the gold has, plated out of the
gold electrolytic palladium, and
topper plate and until solution
is clear. Cathode, and anode washed
in dilute hydro acid which dissolves
Pd & Cu. Remaining gold must about
995. Palladium, after with HNO_3 (?)
washed and ignited

Color on Medals.

On the old style Copper medals
burnt lacquer was kept on in
some of parts and burnt
until the desired color was obtained.
The final polish being obtained by
giving just a slight pressure
between the dies.

On modern brass medals the
surface is polished in lacquer
and then rubbed with pumice
stone a slight frothing under
the end hand and required.

Nickel Working

25% ~~Hot~~ Nickel (98% pure) and 75% Copper are melted in 3200 gsm melts and cast into ingots under and bigger than any we make. They punch 3 Ga tube without slagging. Ingots rolled and annealed with upset without annealing. After this they are annealed and turned in tumbling barrels for 2 weeks with about a 1% sol. of H_2SO_4 .

Most of the black scale is removed by this operation after which they get the bright dip made as follows.



Rubber Slaves (Seamless)
Miller Rubber Co
Akron, Ohio

(Protective Slave)

Electric Sighting & Al. Co
Lockport N.Y.

Silicon Copper. 10% for
softening metal ingots.

Alexander & Patten Co
Richmond
Va. Virginia



$$\begin{array}{r}
 240 \\
 \hline
 32 \overline{) 8000} \\
 \underline{64} \\
 160 \\
 \underline{128} \\
 320
 \end{array}$$

